

MATH 075: Pre-Algebra

Text: *Elementary and Intermediate Algebra: Functions & Authentic Applications* by Jay Lehmann, Chapters 1-4



Topics	Sample Questions												
<p>C1: Introduction to Modeling</p> <ul style="list-style-type: none"> Understand definition of variable versus constant Be able to identify independent and dependent variables Graph coordinate pairs Recognize linear relationships Find x and y intercepts of linear models Use both interpolation and extrapolation to make conclusions <p>C2: Operations and Expressions</p> <ul style="list-style-type: none"> Use order of operations to evaluate expressions with both positive and negative numbers Evaluate expressions with absolute value Evaluate expressions with fractions and/or decimals Translate phrases into mathematical expressions Evaluate basic exponent expressions <p>C3: Using the Slope to Graph Linear Equations</p> <ul style="list-style-type: none"> Graph equations in the form $y = mx + b$ Graph equations of the form $y = b$ and $x = k$ Find an equation of a linear model and use it to make predictions Know the meaning of, and how to calculate, the slope of lines Know the relationship between slopes of parallel and perpendicular lines <p>C4: Simplifying Expressions and Solving Equations</p> <ul style="list-style-type: none"> Simplify expressions which involve the distributive property and combining like terms Solve linear equations both algebraically and graphically Know and use area and perimeter formulas of a rectangle to solve problems Solve formulas for specific variables 	<p>1. Create a scattergram from the table and answer the following questions.</p> <table border="1"> <thead> <tr> <th>X</th><th>Y</th></tr> </thead> <tbody> <tr> <td>1</td><td>16</td></tr> <tr> <td>2</td><td>14</td></tr> <tr> <td>4</td><td>9</td></tr> <tr> <td>5</td><td>8</td></tr> <tr> <td>10</td><td>-2</td></tr> </tbody> </table> <p>a. Draw a line that comes close to the points in your scattergram.</p> <p>b. What is the y-intercept of your line?</p> <p>c. What is the x-intercept of your line?</p> <p>2. Evaluate each of the following expressions using order of operations.</p> <p>a. $3(4 - 7) - 3^2$</p> <p>b. $\frac{2}{5} - \left(\frac{1}{2}\right)\left(\frac{2}{3}\right)$</p> <p>c. $(0.3)(1.2) - \frac{0.8}{0.5}$</p> <p>3. Rewrite the phrase "<i>twice the number minus the product of 5 and the number</i>" as a mathematical expression.</p> <p>4. Find the slope of the line which passes through the points $(4, -1)$ and $(6, -4)$.</p> <p>5. Graph the line $y = -3x + 5$ (without the use of a calculator).</p> <p>6. Are the lines $y = -2x + 3$ and $y = \frac{1}{2}x - 5$ parallel, perpendicular, or neither?</p> <p>7. Simplify $-2(4x - 3) + 3(5x - 1)$.</p> <p>8. Solve $2(x - 1) = 3 + \frac{3}{2}(x - 2)$.</p> <p>9. A person plans to enclose a rectangular garden with fencing. If the width of the garden is 6 feet, and if 20 feet of fencing is required to enclose the garden, what is the length of the garden?</p>	X	Y	1	16	2	14	4	9	5	8	10	-2
X	Y												
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MATH 085: Elements of Algebra

Text: *Elementary and Intermediate Algebra: Functions & Authentic Applications* by Jay Lehmann, Chapters 5-9



Topics	Sample Questions
<p>C5: Linear Functions and Inequalities</p> <ul style="list-style-type: none"> Graph a linear equation both by solving for y and using its intercepts Know and use the definition of function, domain, and range Use function notation with models Find the equation of a line when given either the slope and a point or two points Know point-slope form of a linear equation Solve a linear inequality, describing the solution set both graphically and in interval notation <p>C6: Systems of Linear Equations and Inequalities</p> <ul style="list-style-type: none"> Use graphs to solve systems of linear equations Use substitution and elimination to solve systems of linear equations Identify inconsistent and dependent systems Use systems of equations to solve problems involving perimeter, value, interest, and mixture Solve systems of linear inequalities in two variables <p>C7: Polynomial Functions and Properties of Exponents</p> <ul style="list-style-type: none"> Add, subtract, and multiply polynomials Recognize graphs of quadratics and cubics Use properties of exponents to simplify expressions <p>C8: Factoring Polynomials and Solving Polynomial Equations</p> <ul style="list-style-type: none"> Factor the GCF out of polynomials Factor $ax^2 + bx + c$ when $a = 1$ and $a \neq 1$ Factor difference of squares Use factoring to solve quadratic equations Use quadratic models to make predictions and solve problems <p>C9: Quadratic Functions</p> <ul style="list-style-type: none"> Graph quadratics in vertex and standard form Simplify radical expressions Solve quadratics using the square root property including imaginary/complex solutions Solve quadratics by completing the square Solve quadratics with the quadratic formula Use the discriminant to determine solutions Model situations with quadratics 	<p>1. Find the x and y intercepts of the graph of the equation $4x - 3y = 12$ and graph the equation by hand.</p> <p>2. Let $f(x) = 3x - 1$. Find $f(2)$ and x when $f(x) = 7$.</p> <p>3. Find an equation of the line that passes through the points $(-2, 4)$ and $(1, -2)$.</p> <p>4. Solve $4(2x - 1) - 3(x + 2) \leq 5$ and describe the solution set both graphically and in interval notation.</p> <p>5. Solve $\begin{cases} y = \frac{1}{2}x - 4 \\ y = 2x - 7 \end{cases}$ graphically.</p> <p>6. Solve $\begin{cases} y = 5x + 4 \\ 2x - 3y = -12 \end{cases}$ by substitution.</p> <p>7. Solve $\begin{cases} 2x - 5y = 7 \\ x - 10y = 4 \end{cases}$ by elimination.</p> <p>8. 230 total people attended a fundraising dance that raised \$1528. If adult tickets cost \$8 and kid tickets cost \$5, how many adults and how many kids attended the event?</p> <p>9. Simplify each expression.</p> <p>a. $(x - 3)(x + 5) - (2x + 1)(x - 6)$</p> <p>b. $\left(\frac{-2x^5}{3y^0}\right)^2$</p> <p>10. Factor each expression.</p> <p>a. $x^2 - 5x + 6$</p> <p>b. $36x^2 - 100$</p> <p>c. $3x^2 + 14x - 5$</p> <p>11. Solve $(x - 4)(x - 1) = 4(3x + 2)$.</p> <p>12. A rectangular painting (not including the frame) has a width of 14 inches and a length of 17 inches. If the area of the frame is 102 square inches, what is the width of the frame?</p> <p>13. Simplify $\sqrt{50}$.</p> <p>14. Solve $3x(x - 1) = 4x + 5$ with the quadratic formula.</p>

MATH 095: Intermediate Algebra

Text: *Elementary and Intermediate Algebra: Functions & Authentic Applications* by Jay Lehmann, Chapters 10-13



Topics	Sample Questions
<p>C10: Exponential Functions</p> <ul style="list-style-type: none"> Simplify expressions with negative-integer exponents including scientific notation Simplify expressions with rational exponents Sketch graphs of exponential functions Find equations of exponential functions from two points Find an equation of an exponential model by using data described in words or from a table Determine which type of function best models a situation <p>C11: Logarithmic Functions</p> <ul style="list-style-type: none"> Find inverse functions both graphically and algebraically Use definition and properties of logarithms to evaluate expressions Graph logarithmic functions Solve exponential and logarithmic equations Use properties of natural logarithms to simplify expressions and solve equations Use exponential and logarithmic models to make estimates and predictions <p>C12: Rational Functions</p> <ul style="list-style-type: none"> Find the domain and vertical asymptotes of rational functions Multiply, divide, add, and subtract rational expressions Simplify complex rational expressions Solve rational equations Use rational equations to model authentic problems <p>C13: Radical Functions</p> <ul style="list-style-type: none"> Simplify radical expressions including rationalizing denominators Sketch graphs of square root functions and identify domain and range Solve radical equations Use square root models to make estimates and predictions 	<p>1. Simplify $\frac{(9x^4)^{\frac{3}{2}}}{(-2x^{-5})^3}$</p> <p>2. Graph $f(x) = 4(2)^x$ without a calculator.</p> <p>3. Suppose \$5000 is invested in an account that earns 4.5% interest and is compounded quarterly. How much money will be in the account after 6 years?</p> <p>4. Describe and sketch the standard models of linear, quadratic, and exponential functions.</p> <p>5. Find the inverse of $f(x) = 2x - 7$.</p> <p>6. Rewrite $2\log_3 x + 5\log_3 y - \frac{1}{2}\log_3 z$ as a single logarithm.</p> <p>7. Solve $3e^{2x-5} = 6$.</p> <p>8. Find the domain of $f(x) = \frac{x-5}{x^2-6x+5}$.</p> <p>8. Simplify $\frac{x}{x^2-5x+6} + \frac{3}{3-x}$</p> <p>9. Simplify $\frac{\frac{x-2}{x^2-9}}{\frac{x^2-4}{x+3}}$</p> <p>10. Your car uses 7.2 gallons of gas to drive 180 miles on highways. Estimate how much gas you would use to drive 310 miles on highways.</p> <p>11. Simplify $\frac{\sqrt{40x^8y^3}}{\sqrt{20xy^5}}$</p> <p>12. Solve $\sqrt{3x-1} + 5 = 2$.</p> <p>13. Find an equation of a square root curve of the form $y = a\sqrt{x} + b$ that approximately contains the points (3,7) and (6, 8).</p>